DOCUMENT RESUME

ED 338 423 PS 020 026

AUTHOR Wiecha, Jean L.; And Others
TITLE Nutrition Counts. Massachusetts Nutrition Surveillance System. FY90 Annual Report.
INSTITUTION Massachusetts State Dept. of Public Health, Boston.
PUB DATE Jan 91
NOTE 40p.
PUB TYPE Statistical Data (110) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Anemia; Body Height; Body Weight; *Child Health; Early Childhood Education; Infants; *Nutrition; Physical Development; Physical Health; *State Surveys; Welfare Services; *Young Children
IDENTIFIERS *Massachusetts; Project Head Start

ABSTRACT

"Nutrition Counts," the pediatric portion of the Massachusetts Department of Public Health's (MDPH) Nutrition Surveillance System, monitors and describes aspects of nutritional status among groups of young children in the state. This report presents cross-sectional data describing 5,176 infants and young children in Massachusetts. Of these, 3,181 attended Head Start programs throughout the state, and 1,995 attended private day care programs, public preschools, and public kindergartens in South and Central Berkshire Counties. Data describe these children's nutritional status (height, weight, iron status, and other measures) and Head Start households' participation in AFDC, Food Stamps, Medicaid, and the Special Supplemental Food Program for Women, Infants and Children. FY90 Head Start results are also compared to FY89 and FY88 results. The most common nutrition-related problems among the Head Start sample were overweight, short stature, and probably iron deficiency anemia; of the other group, the problems were short stature in the public preschool group and overweight in the kindergarten group. Recommendations are offered to develop and implement interventions, increase participation in benefit programs, and improve understanding of the problem. The survey form is appended. Contains 14 references. (LB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy

ED338423

NUTRITION COUNTS

Massachusetts Nutrition Surveillance System
FY90 Annual Report

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Jean L. Wrecha

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

PS 020026

Massachusetts Department of Public Health
Bureau of Parent, Child and Adolescent Health
Office of Nutrition
Office of Statistics and Evaluation

January 1991

BEST COPY AVAILABLE

NUTRITION COUNTS

MASSACHUSETTS NUTRITION SURVEILLANCE SYSTEM

FY90 ANNUAL REPORT

1991

Prepared by:

Jean L. Wiecha, M.S.
Carole A. Grandon, M.S., R.D.
Patrice Fisher-Miller, M.P.H.
Diana Seder, M.P.H.

Commonwealth of Massachusetts
Department of Public Health

David H. Mulligan, Commissioner
Deborah Klein Walker, EdD, Assistant Commissioner,
Ruth Palombo, MS, RD, Director, Office of Nutrition
Marlene Anderka, MPH, Director, Office of Statistics & Evaluation

ACKNOWLEDGEMENTS

We are indebted to all the individuals at Massachusetts Head Start programs, kindergartens, community-based day care centers and preschools who participated in Nutrition Counts during FY90. We also extend our thanks to the Administration for Children, Youth and Families, Head Start Bureau for their continued support, to Marlene Anderka, Ruth Palombo, and Karen Peterson at the Massachusetts Department of Public Health for their thoughtful comments and review of this report, to Patricia Powell for preparing the text and tables, and to Dennis Sterzin for graphic design.

For more information on Nutrition Counts, contact:

Jean Wiecha, MS, Office of Nutrition
Massachusetts Department of Public Health
150 Tremont Street
Boston, MA 02111
(617) 727-9283

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
- Nutritional Status i
- Participation in Benefit Programs ii
- Recommendations ii

INTRODUCTION 1
- Overview 1
- Background 1
- Goals and Objectives of Nutrition Counts 3

METHODS 4
- Definitions 4
- Sample 4
- Information Collected 4
- Measurement Methods 5
- MDPH Analysis 5
- Data Quality 6
- Dissemination and Use of Results 6

RESULTS AND DISCUSSION 7
- Head Start 7
- SSPUN Sites 9

IMPLICATIONS OF FINDINGS 10

RECOMMENDATIONS 12

TABLES AND FIGURES 14

SOURCE NOTES 30

APPENDIX 31

EXECUTIVE SUMMARY

Nutrition Counts, the pediatric portion of the Massachusetts Department of Public Health's (MDPH's) Nutrition Surveillance System, monitors and describes aspects of nutritional status among groups of young children in the state. Continuous and regular collection of nutrition data can provide early warning at the community level so program planners and managers can intervene to improve the effectiveness of their programs and to initiate population-based interventions. Participating in surveillance also helps local programs identify individual children needing further assessment or treatment for nutrition problems. This, the third annual Nutrition Counts report, describes FY90 activities of the system, presents and discusses results, and concludes with recommendations for action.

This report presents findings describing 3181 low-income children ranging in age from two years nine months to six years attending sixteen Head Start programs across Massachusetts. Of the children in the Head Start sample, 42% were white, 26% were Hispanic, 22% were black and 3% were Asian. Data on height, weight, iron status, blood lead levels and participation in several benefit programs (Food Stamps, AFDC, WIC, Medicaid) were collected.

This report also presents height and weight data describing 1995 children age two months to eight years at 23 private day care centers, 11 public preschools and 25 public kindergartens in South and Central Berkshire County. These data were collected as part of a Centers for Disease (CDC) funded effort at MDPH to establish a system for surveillance of severe pediatric undernutrition (SSPUN). SSPUN project children screened in Berkshire County were predominantly white. Information on family income and benefit program participation was not available for these children.

NUTRITIONAL STATUS

The most common nutrition-related problems among children in our Head Start sample were overweight, short stature and probable iron deficiency anemia. These conditions were significantly more common than in healthy reference populations. Also, the proportions of children who were overweight or anemic were higher in FY90 than in FY89 or FY88.

Significant nutrition-related problems among children screened through the SSPUN project were short stature in the public preschool group, and overweight in the kindergarten group.

Children in Head Start

- Out of 3181 Head Start children, 423 (13.3%) were considered overweight (high weight-for-height).

- Short stature (low height-for-age), an indicator of possible chronic malnutrition, was identified in 230 (7.2%) of the Head Start children.
- Forty-five (1.4%) of the Head Start children were underweight (low weight-for-height).
- Probable iron deficiency anemia (low hematocrit and/or hemoglobin) was seen in 278 (12.2%) of the 2282 children with hematocrit or hemoglobin measures.
- Among children with specified race status, short stature was seen most frequently among Asian (14.7%) and white (10.9%) children.
- Also among children with known race, overweight was seen most frequently among Hispanic children (17.4%), followed by black (12.8%) and white (10.6%) children.
- Among Head Start children with birthweights reported, 8.5% were born with low birthweights. The proportions of low birthweight children who had short stature or were underweight were twice as high as the proportions of normal birthweight children with these problems.

Children in Private Day Care Centers, Public Preschools, and Public Kindergartens (SSPUN Project).

- In public preschools that target children with physical and developmental disabilities, 25 (11.4%) of 219 children measured had short stature.
- In public kindergartens, 106 (10.1%) of 1050 children measured were overweight.

PARTICIPATION IN BENEFIT PROGRAMS

Seventy-seven percent of the children surveyed in Head Start programs were from households that obtained one or more income, food and/or medical assistance benefits through Aid to Families with Dependent Children (AFDC), Food Stamps, the Special Supplemental Food Program for Women, Infants and Children (WIC) or Medicaid.

- However, at least 26% did not receive AFDC, 28% did not participate in Food Stamps, and 51% did not participate in WIC despite likely eligibility.
- Fifteen percent did not receive any assistance benefits at all.
- Sixty-one percent of Head Start children participated in three or four of these programs (AFDC, Food Stamps, Medicaid and WIC).
- Eighty-nine percent of Head Start children had health coverage through Medicaid or commercial insurance.

RECOMENDATIONS

Collaborative efforts between MDPH, Head Start, and other agencies are needed to:

- Develop and implement interventions that reduce and prevent overweight, short stature and iron-deficiency anemia.
- Increase participation by eligible families in benefit programs.
- Improve understanding of the magnitude, severity, and distribution of nutrition problems among Massachusetts children.

Recommendations are presented in greater detail on pages 12-13.

INTRODUCTION

Growth is one of the most important indicators of a child's health status. The growth of a young child is sensitive to external factors including poor nutritional intake, infectious disease or environmental toxins such as lead. Measures of overweight, underweight, and short stature for age do more than describe the size of a child. These conditions may signal that inadequate food intake, inappropriate food practices or an underlying health condition are present. In addition, nutritional status may be one of many factors that influence a child's attention, cognitive performance, emotional state and social functioning.

Inadequate financial resources can restrict a family's ability to purchase sufficient amounts of food. It is difficult for families with incomes below the poverty level (equivalent in 1989 to $12,100 per year for a family of four) to meet all of their financial and food needs without the benefit of assistance programs. Monitoring participation in food and nutrition assistance programs is important in assessing the nutrition needs of low-income families.

Nutrition Counts, the pediatric portion of the Massachusetts Department of Public Health's (MDPH) Nutrition Surveillance System, monitors and describes aspects of nutritional status among groups of young children in the state. Continuous and regular collection of nutrition data can provide early warning of problems at the community level. Program planners and managers can then intervene to improve the effectiveness of their programs and to initiate population-based interventions. Participating in surveillance also helps local programs identify individual children needing further assessment or treatment for nutrition problems. This, the third annual Nutrition Counts report, describes FY90 activities of the system, presents and discusses results, and concludes with recommendations for action.

OVERVIEW

This report presents cross-sectional data describing 5176 infants and young children in Massachusetts. Of these, 3181 attended Head Start programs throughout the state, and 1995 attended private day care programs, public preschools, and public kindergartens in South and Central Berkshire Counties. Data describe these children's nutritional status (height, weight, iron status and other measures) and Head Start households' participation in AFDC, Food Stamps, Medicaid, and the Special Supplemental Food Program for Women, Infants and Children (WIC). FY90 Head Start results are also compared to FY89 and FY88 results.

BACKGROUND

In 1983 the Massachusetts Department of Public Health's Massachusetts Nutrition Survey found that indicators of poor nutritional status were elevated above levels considered normal among low-income infants and young children[1]. Of the 1429 children age six months to six years included in the survey, almost one in five had at least one indicator of potential malnutrition. In response to survey findings, the state legislature established the Office of Nutrition (ON) in the MDPH and mandated that the Office develop a statewide surveillance system to monitor nutritionally vulnerable groups. Nutrition Counts, the initial project in the Massachusetts Nutrition Surveillance System, began in 1987. With consent from the Administration for Children, Youth and Families (the federal administering agency for Head Start), ON collects Nutrition Counts data from Massachusetts Head Start programs.

The decision to begin Nutrition Counts in Head Start was based on pilot studies conducted in 1986[2]. Head Start enrolls children from low-income families and routinely collects information on their nutritional status, making Head Start an ideal source of surveillance data. Through its health and nutrition components, Head Start also provides a good environment for preventing nutrition problems as well as for identifying and referring children for specialized care. Head Start provides nutritious meals and snacks, carries out comprehensive health screenings that include growth assessment, and works closely with parents when problems are identified. In Massachusetts, 35 Head Start programs serve over 8400 low-income children ranging in age from three years to six years. By regulation, at least 90% of these children come from families with incomes at or less than 100% of the poverty level.

During FY89 and FY90, additional Nutrition Counts data were collected at private day care centers, public preschools and kindergartens in South and Central Berkshire County by MDPH's SSPUN (Surveillance of Severe Pediatric Undernutrition) project staff. SSPUN is a three-year project funded by the Centers for Disease Control (CDC) and is carried out jointly by the MDPH's Office of Statistics and Evaluation and the Office of Nutrition. The project is being conducted in four states and is designed to develop a surveillance system to identify, report and refer severely undernourished children (primarily children less than the 3rd percentile weight-for-height). In Massachusetts, project staff worked with 92 health care and community-based sites in Roxbury, North Dorchester, and South and Central Berkshire County to identify these children.

The three SSPUN settings we report on serve populations that differ from each other and from Head Start. We include them in order to demonstrate that nutritional risk profiles vary among groups of Massachusetts children with different age, socioeconomic status, and other characteristics. The private daycare centers have no income eligibility guidelines and charge a fee for enrollment. However, some of the centers have subsidized slots available to low-income families. The preschools in the public schools are free. By design, they serve a high percentage of children with physical and developmental disabilities who are at risk for having difficulties in school and who lack access to other preschool programs. Finally, the public school kindergartens serve a cross-section of children in the towns where they are located.

Nutrition Counts data are used to estimate the extent of certain potential nutrition problems among children in Massachusetts for whom measurements are available. In addition, Nutrition Counts monitors these annual point prevalence estimates over time. The data are not used to make diagnoses of malnutrition or poor growth in individual children, since some children with high or low weights or heights may be normal and healthy. Although Nutrition Counts can help identify high-risk children, only further assessment of these children will determine if a nutritional problem exists that may require intervention and follow-up.

Nutrition Counts data are also used by the Centers for Disease Control (CDC) in its national pediatric nutrition surveillance system. Currently, 43 states, the Navajo Nation, the Intertribal Council and Washington, DC participate in this system, which monitors height, weight, and indicators of iron-status among a largely low-income population of children. Data collection in Head Start is unique in this system: 71% of CDC's data come from WIC programs, 20% from EPSDT, and 8% from well-child visits.

GOALS AND OBJECTIVES OF NUTRITION COUNTS

The goal of Nutrition Counts is to monitor the nutritional status of preschool children in Massachusetts. The objectives include the following:

- To describe and monitor the nutritional status of children in the Commonwealth, with particular emphasis on higher-risk subgroups (e.g., under age 6, low-income, ethnic minority).
- To provide early warning data and trend data on the extent of malnutrition and nutrition-related health problems in the Commonwealth.
- To enable the Massachusetts Department of Public Health to provide information on nutrition-related problems to legislators, administrators, and others who are responsible for policy, planning, and program management.
- To identify nutrition problems in children served by health, education and/or social service programs in order to facilitate effective program planning, expanded referral systems, and better access to quality health care.
- To enable the Massachusetts Department of Public Health to estimate the extent of unmet need for nutrition services in Massachusetts.
- To provide a research base to investigate relationships among sociodemographic factors (e.g., race, income), program use, nutritional status, health and disease.
- To integrate Massachusetts surveillance data into the national Pediatric Nutrition Surveillance System maintained by the Centers for Disease Control (CDC).

METHODS

DEFINITIONS

Cutoff values used in Nutrition Counts are shown in Table 1. Terms used to characterize the nutritional status of children in Nutrition Counts are:

1. Short stature (low height-for-age)
2. Underweight (low weight-for-height)
3. Overweight (high weight-for-height)
4. Probable anemia (low hemoglobin, low hematocrit)

SAMPLE

Between Fall 1989 and Spring 1990, Nutrition Counts received information on 3196 children age two years nine months to six years attending 16 Massachusetts Head Start programs. Individual programs submitted from 15 to 511 forms depending on the size of the program and the number of measurements taken.

During the same time period, Nutrition Counts also received information describing 1995 children from SSPUN sites including 23 private day care centers, 11 public preschools and 25 public school kindergartens in South and Central Berkshire County. Children enrolled in the private day care centers ranged in age from 2 months to 7 years. The preschool children ranged in age from 3 years to 6 years, and the kindergarten children ranged in age from 5 years to 8 years.

Children in the Nutrition Counts sample are representative of the Head Start, private day care programs, public preschools and kindergartens participating in Nutrition Counts only, and are not necessarily representative of all children of like age, race or socioeconomic status in the Commonwealth.

INFORMATION COLLECTED

Head Start. Head Start programs completed Nutrition Counts data forms (Appendix) once during the 1989-1990 school year. Data were coded to protect children's anonymity. Information was submitted voluntarily to Nutrition Counts by Head Start staff, who are required by federal regulations to obtain nutritional status data on all children. In general, Head Start programs submitted a data form for each child enrolled, although several programs submitted forms for a portion of the children enrolled. For each child reported, Head Start staff measured height and weight, and reported sex, age, birthdate, and date of measurement. For many children they also reported hemoglobin and/or hematocrit, free erythrocyte protoporphyrin (FEP) and/or blood lead (along with date of bloodwork), birthweight, blood pressure, and household participation in AFDC, Food Stamps, Medicaid, and WIC.

SSPUN Sites. At most private day care centers, public preschool and public kindergartens, cross-sectional data were obtained by MDPH staff who weighed and measured all children present on measuring days. At several SSPUN sites, data were collected by trained site staff. Data were collected using the Nutrition Counts data form (Appendix)

which included height, weight, sex, age, race (when available), birthdate and date of measurement.

MEASUREMENT METHODS

To maximize data quality, Office of Nutrition (ON) nutrition surveillance coordinators trained Head Start and SSPUN staff in measuring children, selecting and maintaining appropriate equipment for weighing and measuring, and in using the Nutrition Counts data form. Measurers were instructed to weigh children to 1/4 pound using beam balance or SECA-770 digital scales, and to measure their heights to 1/8 inch using wall-mounted metal measuring tapes and headblocks (Handi-Stats, Perspective Enterprises, Kalamazoo, Michigan), stadiometers or length measuring boards. All SSPUN data were collected according to these protocols. Most Head Start programs complied with these protocols, but two of them lacked appropriate height measuring equipment and one lacked an appropriate scale when data collection took place in FY90. Currently (FY91), all Head Start programs in Nutrition Counts have access to appropriate equipment.

MDPH ANALYSIS

MDPH's Office of Statistics and Evaluation cleaned data to remove records with missing heights and weights or with outlying values (child's age less than 33 months with height/age or weight/age above 95th percentile, or any Z-score less than or equal to -6.0). Aggregate descriptive data were compiled using the Statistical Analysis System[3]. Z-scores and 95% confidence intervals were calculated for the proportion of children with short stature, underweight, overweight, and probable iron deficiency anemia using CASP[4] and dEpid[5] statistical software.

Prevalence estimates for underweight, short stature and overweight were considered significantly different from National Center for Health Statistics (NCHS) reference populations if 95% confidence intervals did not include the expected value of five percent.

For Head Start children, prevalence estimates were also calculated for probable iron deficiency anemia, high blood pressure, lead poisoning, and low birthweight. In these estimates, prevalence was defined as the proportion of children with the outcome under study among children with a measure of that outcome.

We also examined the Head Start sample to obtain percentages of children participating in AFDC, Food Stamps, Medicaid or other health insurance, and WIC. In addition, we estimated the proportion of children eligible for WIC according to age and nutrition risk who were not enrolled in this program. We assumed all households of Head Start children were income eligible for WIC (185% of federal poverty guidelines). Estimates of program participation and insurance coverage levels are the proportion of children participating among all children (2670) in 15 programs providing these data. No program participation or insurance data were available from one Head Start program (511 children).

All analyses were carried out by the Office of Statistics and Evaluation (OSE) at MDPH. OSE also prepares and sends Nutrition Counts data to the Centers for Disease Control (CDC) for inclusion in its national pediatric nutrition surveillance system.

DATA QUALITY

Random measuring or recording errors are unavoidable in any growth monitoring system with many observers and many data collection points. In FY90 we sought out ways of finding and minimizing systematic measurement errors that could affect the validity of our findings from Head Start programs. Data quality monitoring was not undertaken at SSPUN sites because measurements were taken by two highly trained SSPUN project staff.

To monitor data quality at Head Start programs we used computer checks and visited Head Start programs to observe measurement practices and provide brush-up training. We were specifically concerned that the high prevalence of overweight among Head Start children might be partly due to misclassification. This would occur if children's heights were measured inaccurately low, or if weights were inaccurately high; in either case, weight-for-height would be artificially inflated. In the aggregated data, there was no evidence that overweight children were more likely to have low height-for-age, nor were short children more likely to have high weight-for-height. Furthermore, while overweight increased, the prevalence of short stature declined slightly this year compared to last year.

In visits to several Head Start programs, children's measurements were taken by Head Start staff and then were repeated by an ON nutrition surveillance staffperson using Head Start's equipment. Weight measurements were taken accurately by Head Start staff. There were some errors in height measurements. In the majority of these, Head Start staff measured children slightly taller (about 1/4 inch) than ON staff did. Such errors would tend to reduce the prevalence of overweight, since they would lower weight-for-height.

DISSEMINATION AND USE OF RESULTS

Each Head Start program that participated in Nutrition Counts received an individualized report from MDPH's Office of Nutrition tabulating that program's information. Children at risk for nutrition-related problems and in need of further evaluation were identified by code only. Programs received their reports three to seven weeks from the date that all of their data arrived at MDPH. ON helped programs use the reports for follow-up of individual children and for program planning. For example, ON is assisting several Head Start programs with projects addressing obesity and anemia.

An aggregate report tabulating day care, preschool and kindergarten data was compiled by ON and SSPUN staff and distributed to participating SSPUN sites. Parents of all day care center children received special parent packets prepared by the SSPUN staff which included their child's growth chart and information on pediatric growth and nutrition.

RESULTS AND DISCUSSION

Results from Head Start programs and SSPUN sites (private day care centers, public preschools and kindergartens) are presented separately because the groups differ in: race, age range, geographic distribution, types of data collected (only anthropometric and demographic data were collected at SSPUN sites) and family income.

HEAD START

Sample. The final sample consisted of 3181 children from 16 Head Start programs (Table 2). Data on 15 (0.5%) of the original 3196 children were taken out of the sample because of missing or biologically implausible information. Within the final sample, 2282 (71.7%) had a hematocrit or hemoglobin value reported, 1891 (59.4%) had a free erythrocyte protoporphyrin (FEP) reported, and 536 (16.9%) had a blood lead value reported.

Anthropometric Evidence of Poor Nutrition. Among Head Start children, 13.3% were overweight (95% confidence interval (CI) 12.1% to 14.5%) and 7.2% had short stature (95% CI 6.3% to 8.1%) (Figure 1). These proportions are higher than the 5% expected based on reference populations. The prevalence of underweight was 1.4% among Head Start children, and was lower than expected (95% CI 1.0% to 1.8%). In individual Head Start programs, the prevalence of overweight ranged from 3.6% to 21.9%; short stature ranged from 1.5% to 16.0% and underweight ranged from 0% to 2.7% (Table 3).

Race and Anthropometry. Table 4 shows the distribution of short stature, underweight and overweight by race in the Head Start sample.

The prevalence of short stature varied across racial groups. It was most common among white and Asian children (10.9% and 14.7% respectively). These groups were over-represented among children with short stature; that is, while only 42% of Nutrition Counts children were white, 63% of children with short stature were white. Similarly, while 3% of Nutrition Counts children were Asian, 6% of children with short stature were Asian. Black and Hispanic children were under-represented among those with short stature.

Underweight was distributed proportionately and fairly evenly across racial groups. Among children with known race, overweight was highest among whites (10.6%), blacks (12.8%), and Hispanics (17.4%). In addition, Hispanic children were over-represented among overweight children. Asian children were under-represented. A substantial proportion of children without specified race were overweight (about 19%).

Birthweight and Anthropometry. Of the 3181 Head Start children in Nutrition Counts, 2271 had birthweights reported. Of these, 194 (8.5%) were low birthweight (LBW). Among children with birthweights reported, 27 (13.9%) of LBW children had heights below the fifth percentile, twice the proportion of NBW children with short stature (7.4%).

Moreover, while 1.3% of NBW children were underweight, 3.1% of LBW children were underweight. The higher proportion of underweight among LBW children in Nutrition

Counts may in part be an artifact of small sample size, since only 27 NBW and 6 LBW Head Start children with birthweights reported were underweight overall.

It is important to note that LBW can be a manifestation of either premature birth or intrauterine growth retardation (IUGR) (which can be present in both preterm and in full-term babies). We did not collect information to distinguish between low birthweight due to prematurity or IUGR. In clinical settings, ages of premature children are generally adjusted until the age of 3 years 6 months (by subtracting weeks premature from age) before plotting height on growth charts[6]. Because we were unable to make this adjustment, some children younger than 3-1/2 years who were born prematurely may have been misclassified as having short stature.

Three Year Trends. We compared prevalence estimates from FY88, FY89, and FY90 data collection in two ways to see whether any changes had occurred in proportions of children with short stature, underweight, overweight or probable iron-deficiency anemia. First, we compared data from the seven programs that submitted data in FY88, FY89, and FY90. These comparisons are among total program results and were not matched for individual children. The FY90 prevalence estimate for overweight (14.1%) was higher than it was in FY89 (9.6%) or in FY88 (9.2%). This was also true for probable iron-deficiency anemia, which rose to 12.5% in FY90 from 9.4% and 8.3% in fiscal years '88 and '89, respectively. Short stature and underweight decreased in FY90 (Figure 2).

Second, we compared prevalence estimates among all Nutrition Counts children in each year. Again, an increase in overweight and anemia was seen in FY90. Short stature decreased slightly in FY90, and underweight has remained constant from FY88 to FY90 (Figure 3).

Compared to FY88 and FY89, FY90 saw changes not only in anthropometric findings, but in the racial composition of Nutrition Counts children as well. At the seven programs with three years of data, 35% of children were Hispanic and 43% were white in FY90. By contrast, about 25% were Hispanic and 56% were white in the previous years. When all Nutrition Counts children are considered, other changes appear. In FY90 22% of children were black and 42% were white, versus about 12% who were black and about 60% who were white in FY88 and FY89. Both overweight and anemia are more common among black and Hispanic Nutrition Counts children than among white children.

Anemia; Lead Poisoning. Among the 2282 Head Start children for whom hemoglobins and/or hematocrits were available, 278 (12.2%; 95% CI 10.8% to 13.5%) had probable iron deficiency anemia, exceeding the expected value of 5% seen in reference populations (Table 5). Program prevalences ranged from 0% to 18.3%. The prevalence of probable anemia varied by race and was highest among black children (17.4%) (Figure 5). Race was unknown in 104 children with hematocrits or hemoglobins; had this information been available the race-specific estimates might be different. In addition, 9.0% (172) of 1891 children with FEP measurements had high values suggesting anemia or possible lead poisoning, and 35 (6.5%) of the 536 lead measurements were elevated. While anemia and lead poisoning may be related, we did not have enough data to examine this in our sample.

Program Participation. In FY90, 77% of the Head Start children came from families that received benefits from one or more means-tested benefit programs (AFDC, Food Stamps, Medicaid or WIC) (Table 6). Moreover, 61% of the sample participated in at least three of these programs. The most common pattern of multiple program participation was AFDC, Medicaid, Food Stamps and WIC reported in 848 (32%) of cases. These findings were similar to those from FY89.

As in FY89, about 68% of the sample was enrolled in Medicaid (Table 7). In total, 89% of the children had some form of health insurance (Medicaid or private insurance), a decrease from 95% in FY89.

Some Head Start children were from families that were not receiving benefits for which they were probably income-eligible (since they met Head Start's own income eligibility guidelines). For example, 12.9% (410) of all Head Start children in Nutrition Counts did not participate in any of the four programs we examined (Table 6). Over one quarter did not participate in AFDC (699, 26%) or Food Stamps (746, 27.9%) (not shown). Nevertheless, as in FY89, about two-thirds of Head Start children did participate in each of these programs (Table 7); the status of other children was unknown.

About 44% of Head Start children were in WIC (Table 7). Over half (51.3%) of the 1147 children eligible for WIC based on size or iron status were not enrolled in WIC (not shown). WIC certifies children who meet other nutritional risk criteria that we did not consider, including diet, and certain medical conditions. We do not know how considering these other risk factors would change our figures.

SSPUN SITES

Sample. The sample consisted of 726 infants and children from 23 day care centers, 219 children from 11 public preschools, and 1050 children from 25 public school kindergartens. Characteristics of the SSPUN groups are shown in Table 8.

Anthropometric Evidence of Poor Nutrition. Aggregated results from SSPUN sites are shown in Figure 5. Among private day care center children, 6.9% were overweight (95% CI 5.0% to 8.7%, borderline significant), while 6.2% of children had short stature (95% CI 4.4% to 8.0%, not significant). Fewer than 1% were underweight. Results for individual day care centers are presented in Table 9.

Among preschool children, 7.3% (95% CI 3.9% to 10.8%) were overweight (not significantly elevated), and 11.4% had short stature, which was a statistically significant increase above normal (95% CI 7.2% to 15.6%). Fewer than 1% were underweight. Results for individual preschools are presented in Table 10.

Among kindergarten children, 10.1% were overweight (95% CI 8.3%, 11.9%), while 5.4% had short stature (95% CI 4.1% to 6.8%), and 1.4% were underweight (95% CI 0.7% to 2.1%). Of these results, overweight and underweight were significantly different from expected values (5%). Results for individual kindergartens are presented in Table 11.

IMPLICATIONS OF FINDINGS

Probable iron-deficiency anemia, overweight, and short stature were the leading nutrition problems among the children in Nutrition Counts in FY90. The differences and similarities in anthropometric findings between Head Start, private day care centers, public preschools, and public kindergartens are intriguing and warrant further study of the relationships among growth, socioeconomic status, ethnicity, and risk of developmental or cognitive delay.

While some children are normally thinner, shorter, or heavier than their peers, in other children these conditions are symptoms of poor nutrition, poor health, or environmental stresses. When prevalence estimates are significantly higher than 5%, the causes need to be determined and actions need to be taken. Stunting and wasting may follow chronic illness or repeated acute illnesses, and may be associated with environmental stresses including poverty, lack of medical care, exposure to toxins, and disordered parent/child interactions that affect growth and feeding[7]. Children whose measures indicate they are overweight compared to peers may be obese (have excess body fat). Pediatric obesity can cause psychosocial problems, and is associated with high blood pressure, hypercholesterolemia, and respiratory problems. Moreover, it may continue into adulthood, when it is associated with diabetes, heart disease, and other health problems. Diet, heredity, lack of physical activity and stress can all contribute to pediatric obesity[8].

Children who are anemic, underweight, overweight or short for their age are a high-risk group and should receive immediate assessment and follow-up. Confirmation of diagnosis, referral to appropriate health, nutrition, and social services, and monitoring of children with extreme height, weight, or blood measures can be accomplished at Head Start programs.

Nutrition Counts data suggest overweight is common across income strata in Massachusetts preschoolers and may be common in school children as well. The prevalence of overweight was significantly elevated above normal among Head Start children and children attending kindergartens, and was elevated at borderline statistical significance in private day care centers. In three years of surveillance through Nutrition Counts, overweight has always been the most prevalent anthropometric problem. Further assessment of weight status among schoolchildren is warranted, since schools are increasingly become a focus for health promotion and nutrition education. Culturally appropriate, family-centered interventions that increase physical activity and develop healthy eating habits early in life may help reduce pediatric overweight and obesity.

The prevalence of low hematocrits and hemoglobin values (12.2%) suggests that anemia is common among Head Start children and varies with ethnicity. The causes may be dietary, environmental (i.e., from lead exposure), and/or genetic (hemoglobinopathies). Prevention and intervention strategies, based on more in-depth etiological assessment, are warranted in light of the persistent elevation of anemia over the past three years and its associated health risks. These include increased susceptibility to illness and lead poisoning, as well as attention and cognitive deficits.[9],[10]

Low-income preschoolers (especially whites and Asians) and those in a developmentally "at-risk" group had more short stature than other children observed by Nutrition Counts this year. The etiology of short stature may include not only malnutrition but also psychosocial deprivation syndromes. Hence, treatment requires careful assessment and interventions and

may be best accomplished on an individual basis. Health promotion activities that ensure the good nutrition of all young children could also help reduce the prevalence of short stature.

The prevalence of underweight among Head Start and SSPUN children studied is significantly lower than expected, suggesting that acute undernutrition is not a common problem in the groups we observed. Nevertheless, among individual children, acute undernutrition is serious and warrants prompt assessment and treatment where indicated.

Low birthweight (less than 5.5 pounds), especially due to chronic intrauterine growth retardation, may affect stature throughout infancy, childhood, and even adolescence.[11],[12],[13],[14] Among Head Start children, those born at low birthweight appear to be at a higher risk for underweight as well as short stature. While some of their apparent size deficits may be accounted by correcting for premature birth, prematurity alone would not explain excessive thinness. Moreover, the rate of low birthweight among Head Start children (8.5%) in Nutrition Counts was higher than the rate in the state as a whole (less than 6%) in the mid- to late 1980's when these children were born (MDPH, 1988). This may reflect the higher level of poverty among Head Start children compared to Massachusetts children overall.

Our program participation data showed that many households in the Nutrition Counts Head Start sample used benefit programs; however, some did not. While Head Start already routinely refers families to benefit programs, our data suggest that some households still do not receive benefits for which they are eligible. To address this issue, it will be necessary to validate participation data and find out if nonparticipation by eligible households is due to lack of information about programs, lack of interest, or some other reason. Plans for improving participation should be based on these findings.

Applicability of Findings to Other Groups. We caution against using Nutrition Counts prevalence estimates to extrapolate proportions of malnourished children in other low-income preschool populations since these populations may not be comparable and programs in Nutrition Counts were not randomly selected. For example, Head Start may improve nutritional status because the program provides nutritious meals and snacks to children as well as nutrition education for staff, parents and children. This could cause our nutrition status prevalence estimates in Head Start to be lower than they might be among other low-income preschool children.

Furthermore, data from Nutrition Counts on participation in benefit programs may not apply to non-Head Start low-income households. There was a high rate of participation in benefit programs among our Head Start sample. However, households participating in Head Start may be more likely to use government benefits than other households, and are often referred to such programs by Head Start staff. Therefore, our results probably overestimate participation by low-income households in the government assistance programs studied.

RECOMMENDATIONS

1) In light of the seriousness of current funding constraints, collaborative, creative efforts are required to address the growth problems and program participation issues identified by Nutrition Counts. Coordination among local and regional Head Start staff, MDPH, Cooperative Extension's Expanded Food and Nutrition Education Program (EFNEP), ACYF, the Massachusetts Department of Education and other medical and nutrition professionals can help prevent and reduce the prevalence of overweight, short stature, and anemia in Head Start children and among other high-risk infants and children. Such coordination can also help ensure that all households eligible for means-tested benefits have access to them. Specifically, we recommend that:

   - MDPH, ACYF, Head Start and EFNEP collaborate to increase the proportion of Head Start parents and staff that receive education in nutrition, eligibility for food assistance programs, and related topics. EFNEP's leadership in this initiative and its expansion to currently unserved areas of Massachusetts will be critical for success in this regard.
   - MDPH should continue to work with Head Start programs to develop and pilot model health promotion projects that are community-based, family-centered and culturally appropriate.
   - MDPH should work more closely with Head Start Health Coordinators to promote nutrition and health education activities.
   - The Office of Nutrition and the Massachusetts Department of Education (MDOE) should collaborate to encourage Head Start programs to participate in food and nutrition programs and nutrition education offered by MDOE's Bureau of School Nutrition Services.
   - The Office of Nutrition, in conjunction with Head Start staff, should develop innovative strategies that local programs can use to prevent and reduce the prevalence of overweight, short stature, anemia, and underweight.
   - Surveillance of program participation levels should be continued through Head Start, particularly in light of impending budget cuts.

2) In order to improve the quality of monitoring efforts and to improve our understanding of pediatric nutrition problems in the Commonwealth:

   - MDPH should support and/or participate in efforts to screen a more representative cross-sectional sample of Massachusetts children for nutrition problems. This will clarify the magnitude, severity and distribution of overweight, short stature, underweight and anemia among the Commonwealth's children so that interventions can be targeted appropriately.
   - MDPH should support and/or participate in efforts to identify the etiology of iron deficiency anemia in Head Start children so that appropriate interventions can be planned.

- The Department of Public Health's Office of Nutrition should continue to work with the Head Start program to facilitate the identification, treatment, referral and follow-up of Head Start children at nutritional risk.
- The Office of Nutrition should continue to enhance nutrition assessment skills of Head Start staff through training and technical assistance, to improve the reliability of height and weight measurement techniques, and to develop Nutrition Counts reports that are timely, informative and easy to use for identification and follow-up of high-risk children.
- Finally, we recommend that interventions incorporate the *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* (U.S. Public Health Service, 1990) in their planning, implementation, and evaluation. National objectives for preschoolers include reducing growth retardation, anemia, and dietary fat, and increasing the proportion of preschools providing nutrition education.

Table 1
CRITERIA FOR ABNORMAL VALUES
Nutrition Counts, FY90

Indicator	Cut-Off Value	Interpretation
Low Height-for-Age	<5th percentile[1]	Short stature; possible chronic undernutrition
Low Weight-for-Age	<5th percentile	Underweight; possible chronic or acute undernutrition
Low Weight-for-Height	<5th percentile	Underweight; possible acute undernutrition
High Weight-for-Height	>95th percentile	Overweight or possible obesity; possible chronic overfeeding or lack of activity
Low Hemoglobin[2] 1-1.9 yrs 2-4.9 yrs 5-7.9 yrs	<11.0 grams/dl <11.2 grams/dl <11.4 grams/dl	Possible iron deficiency anemia
Low Hematocrit[2] 1-1.9 yrs 2-4.9 yrs 5-7.9 yrs	<33% <34% <34.5%	Possible iron deficiency anemia
High Free Erythrocyte Protoporphyrin	≥35 ug/dl[3]	Possible iron deficiency anemia and/or lead poisoning
High Lead	≥25 ug/dl[3]	Lead poisoning
Low Birthweight	<2500 grams	Low Birthweight

[1]All percentiles, National Center for Health Statistics (NCHS) growth charts

[2]All anemia values, Centers for Disease Control, MMWR 38(22):400-404, 1989.

[3]Centers for Disease Control; Center for Environmental Health. Preventing lead poisoning in young children. Atlanta, GA: CDC, January 1985.

Table 2
CHARACTERISTICS OF NUTRITION COUNTS CHILDREN FROM MASSACHUSETTS HEAD START PROGRAMS, FY90

	Number	Percent
RACE		
White	1334	41.9%
Hispanic	837	26.3%
Black	698	21.9%
Asian	95	3.0%
Other	79	2.5%
Missing	138	4.3%
Total	3181	99.9%[1]
AGE		
< 3 years	42	1.3%
3-5 years	2838	89.2%
> 5 years	301	9.5%
Total	3181	100.0%
SEX		
Male	1615	50.8%
Female	1566	49.2%
Total	3181	100.0%

Source: MDPH, Office of Nutrition, 1990

[1]Column does not add to 100.0% due to rounding.

Table 3
MASSACHUSETTS HEAD START PROGRAMS IN NUTRITION COUNTS
PREVALENCE OF SHORT STATURE, UNDERWEIGHT, AND OVERWEIGHT
Program and State Totals, FY90

Program	Number of Children	Short Stature		Under-Weight		Over-Weight	
		N	%	N	%	N	%
ABCD	511	22	4.3	6	1.2	66	12.9
Berkshire County	256	41	16.0	3	1.2	27	10.6
Cambridge	150	5	3.3	3	2.0	26	17.3
Chelsea/CAPIC	133	2	1.5	1	0.8	14	10.5
Fall River	111	8	7.2	3	2.7	4	3.6
Framingham/SMOC	133	9	6.8	0	0.0	20	15.0
Franklin County	117	14	12.0	2	1.7	9	7.7
Greater Lawrence	206	10	4.9	4	1.9	40	19.4
Hampshire County	116	12	10.3	3	2.6	11	9.5
Leominster/MOC	314	25	8.0	3	1.0	36	11.5
New Bedford	205	25	12.2	5	2.4	15	7.3
Somerville	119	7	5.9	1	0.8	26	21.9
South Shore	115	7	6.1	2	1.7	15	13.0
Springfield	257	6	2.3	5	2.0	46	17.9
Westfield[1]	15	2	N/A	0	N/A	0	N/A
Worcester	423	35	8.3	4	1.0	68	16.1
Total	3181	230	7.2	45	1.4	423	13.3

Source: MDPH, Office of Nutrition, 1990.

[1]Percentages not calculated due to small program size.

Table 4

MASSACHUSETTS HEAD START PROGRAMS IN NUTRITION COUNTS
PREVALENCE OF SHORT STATURE, UNDERWEIGHT, AND OVERWEIGHT
BY RACE, FY90

Race	Total	Short Stature (SS)			Underweight (UW)			Overweight (OW)		
		Children in race group w/ short stature (SS)		*% of all children w/ SS from race group*	*Children in race group w/ under-weight (UW)*		*% of all children w/ UW from race group*	*Children in race group w/ over-weight (OW)*		*% of all children w/ OW from race group*
		n	%		*n*	%		*n*	%	
White	1334	145	(10.9)	63.0	19	(1.4)	42.2	141	(10.6)	33.3
Black	698	28	(4.0)	12.2	10	(1.4)	22.2	89	(12.8)	21.0
Hispanic	837	35	(4.2)	15.2	11	(1.3)	24.4	146	(17.4)	34.5
Asian	95	14	(14.7)	6.1	1	(1.1)	2.2	6	(6.3)	1.4
Other[1]	79	2	(2.5)	0.9	1	(1.3)	2.2	15	(19.0)	3.6
Missing	138	6	(4.3)	2.6	3	(2.2)	6.7	26	(18.8)	6.1
Total	3181	230	(7.2%)	100.0	45	(1.4%)	99.9[2]	423	(13.3%)	99.9[2]

Source: MDPH, Office of Nutrition, 1990.

[1]Includes children of mixed race.

[2]Columns do not add to 100.0% due to rounding.

Table 5

MASSACHUSETTS HEAD START PROGRAMS IN NUTRITION COUNTS

PREVALENCE[1] OF ABNORMAL BLOOD VALUES

Program and State Totals, FY90

Program	Hematocrit or Hemoglobin			Free Erythrocyte Protoporphyrin			Lead	
	N Measures	N Low	% Low	N Measures	N High	% High	N Measures	N High
ABCD	450	76	16.9	369	42	10.3	157	4
Berkshire	240	17	7.1	183	12	6.6	68	5
Cambridge	99	6	6.1	47	2	--	7	0
Chelsea/CAPIC	50	9	18.0	34	3	--	4	1
Fall River	101	8	7.9	106	8	7.5	2	1
Framingham/SMOC	0	0	0.0	131	4	3.1	3	0
Franklin County	77	3	3.9	54	4	7.4	24	10
Greater Lawrence	201	29	14.4	88	11	11.4	116	2
Hampshire County	89	16	18.0	80	8	7.5	21	1
Leominster/MOC	268	19	7.1	265	32	10.9	43	3
New Bedford	136	12	8.8	163	17	9.8	17	2
Somerville	60	11	18.3	69	6	7.2	5	0
South Shore	99	8	8.1	44	2	--	0	0
Springfield	110	17	15.5	23	3	--	5	2
Westfield	15	2	--	15	3	--	1	0
Worcester	287	45	15.7	220	15	6.4	63	4
Total	2282	278	12.2%	1891	172	9.0%	536	35

[1]Percentage calculations were omitted for samples of fewer than 50 children.

Table 6
MASSACHUSETTS HEAD START PROGRAMS IN NUTRITION COUNTS
PARTICIPATION IN AFDC, FOOD STAMPS, MEDICAID AND WIC
Participation Patterns
FY89 and FY90

Number of Programs	FY89 Number & Percent Participating (N=3552)		FY90 Number & Percent Participating (N=3181)	
	N	%	N	%
All Four Programs[1]	1060	29.8	848	31.8
Any Three Programs[1]	999	28.1	779	29.2
Any Two Programs[1]	273	7.7	195	7.3
Any One Program[1]	512	14.4	236	8.8
No Programs[2]	477	13.4	410	15.4
Other[3]	231	6.5	713	7.6

Source: MDPH, Office of Nutrition, 1990.

[1]Indicates child's record identified child as a participant.

[2]Child's record indicates child was not a participant in any of these programs.

[3]Most data were unknown; child was not known to participate in any of these programs.

Table 7
MASSACHUSETTS HEAD START PROGRAMS IN NUTRITION COUNTS
PARTICIPATION IN AFDC, FOOD STAMPS, MEDICAID AND WIC
Participation Patterns
FY89 and FY90

Program	FY89 Number & Percent Participating[1] N=3552		FY90 Number & Percent Participating[1] N=2670[2]	
	N	%	N	%
AFDC	2206	62.1	1659	62.1
Food Stamps	2179	61.3	1700	63.7
Medicaid	2427	68.3	1814	67.9
WIC	1483	41.8	1182	44.3

Source: MDPH, Office of Nutrition, 1990.

[1]Includes children reported participating. Children not counted as participants include definite non-participants and those with unknown participation.

[2]Represents all children at the 15 Head Start programs that were able to provide program participation data in FY90.

Table 8
CHARACTERISTICS OF NUTRITION COUNTS CHILDREN FROM BERKSHIRE COUNTY PRIVATE DAY CARE CENTERS, PUBLIC PRESCHOOLS, AND PUBLIC SCHOOL KINDERGARTENS, FY90

Characteristic	Day Care		Preschool		Kindergarten	
	n	%[1]	n	%	n	%[1]
RACE						
White	666	91.7%	109	49.8%	447	42.6%
Black	32	4.4%	1	0.5%	6	0.6%
Asian	13	1.8%	2	0.9%	1	0.1%
Hispanic	2	0.2%	2	0.9%	1	0.1%
Other	1	0.1%	0	0.0%	0	0.0%
Missing	12	1.7%	105	47.9%	595	56.7%
Total	726	99.9%	219	100.0%	1050	100.1%
AGE						
≤ 1 year	9	1.2%	0	0.0%	0	0.0%
> 1-3 yrs	94	12.9%	0	0.0%	0	0.0%
> 3-6 yrs	602	82.9%	216	98.6%	770	73.3%
> 6 years	21	2.9%	3	1.4%	280	26.7%
Total	726	99.9%	219	100.0%	1050	100.0%
SEX						
Male	383	52.8%	119	54.3%	532	50.7%
Female	343	47.2%	100	45.7%	518	49.3%
Total	726	100.0%	219	100.0%	1050	100.0%

Source: MDPH, Office of Nutrition and Office of Statistics & Evaluation, 1990

[1]Column does not add to 100.0% due to rounding.

Table 9
BERKSHIRE COUNTY PRIVATE DAY CARE CENTERS IN NUTRITION COUNTS
PREVALENCE OF SHORT STATURE, UNDERWEIGHT, AND OVERWEIGHT
Program and State Totals, FY90

Program	Number Of Children	N Short Stature	N Under-Weight	N Over-Weight
Berkshire Family Center	44	3	0	7
Boys' Club	66	1	0	5
Dalton Childrens	12	1	0	1
Egremont Coop	10	1	0	2
Elms Nursery	46	0	0	1
G. Brigham C.C.	43	9	0	2
Great Barrington	27	0	2	1
Kids Preschool	35	0	1	2
Knesset Israel	34	1	0	2
Learning Center	53	5	0	3
Lee Youth Association	11	1	0	2
Lenox Childrens	23	2	0	1
Montessori	28	1	0	1
Pittsfield Girls Club	13	2	0	0
Red Door	32	1	0	1
Richmond Preschool	29	1	0	4
Rockwell E.C.C.	33	7	0	2
S. Berkshire E.C.C.	12	2	0	2
St. Paul's C.C.	28	2	0	0
Sunshine Nursery	10	0	0	0
Tot Spot	56	2	0	2
Wendell Nursery	28	2	0	0
YMCA E.C.C.	53	1	1	9
Totals	726	45	4	50
		(6.2%)	(0.6%)	(6.9%)

Table 10
BERKSHIRE COUNTY PUBLIC PRESCHOOLS IN NUTRITION COUNTS
PREVALENCE OF SHORT STATURE, UNDERWEIGHT, AND OVERWEIGHT
Program and State Totals, FY90

Program	Number of Children	N Short Stature	N Under-Weight	N Over-Weight
Craneville	20	2	0	0
Crosby	9	2	0	0
Lanesboro	12	1	0	2
Lee Central	35	4	0	5
Morningside	15	2	0	1
Morris	11	2	0	1
Otis	22	2	0	1
Sandisfield	6	1	0	0
Sheffield	31	3	0	2
Stockbridge	10	1	1	0
West Side	48	5	0	4
Total	219	25	1	16
		(11.4%)	(0.5%)	(7.3%)

Source: MDPH, Office of Nutrition and
Office of Statistics & Evaluation, 1990

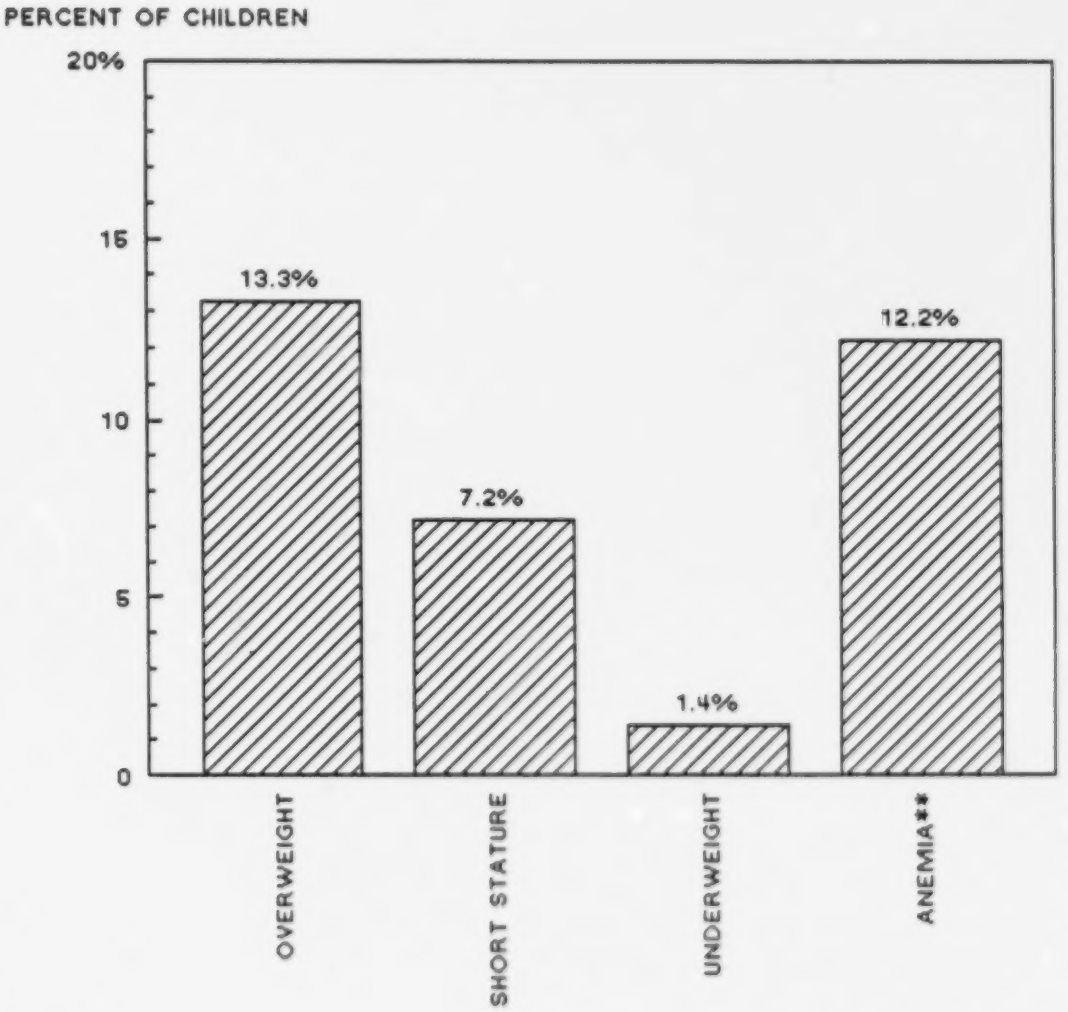
Table 11
BERKSHIRE COUNTY PUBLIC KINDERGARTENS IN NUTRITION COUNTS
PREVALENCE OF SHORT STATURE, UNDERWEIGHT, AND OVERWEIGHT
Program and State Totals, FY90

Program	Number of Children	N Short Stature	N Under-Weight	N Over-Weight
Alford	16	1	0	1
Allendale	70	4	0	3
Becket	31	1	0	4
Bryant	34	0	0	4
Craneville	86	9	1	9
Crosby	89	2	2	7
Egremont	75	5	2	6
Hancock	6	0	0	1
Highland	42	5	1	1
Hinsdale	34	0	1	4
Housatonic	35	1	2	7
Lanesboro	58	2	0	6
Lee Central	48	3	0	4
Monterey	12	0	0	3
Morningside	85	3	2	4
Morris	40	3	1	6
Otis	19	1	0	3
Richmond	22	2	0	2
Sandisfield	6	1	0	1
Sheffield	29	3	0	3
Stearns	22	0	0	2
Stockbridge	19	1	0	2
West Side	88	7	3	16
W. Stockbridge	21	1	0	2
Williams	63	2	0	5
Total	1050	57	15	106
		(5.4%)	(1.4%)	(10.1%)

Source: MDPH, Office of Nutrition and
Office of Statistics & Evaluation, 1990

FIGURE 1

OVERWEIGHT, SHORT STATURE, UNDERWEIGHT & ANEMIA HEAD START CHILDREN

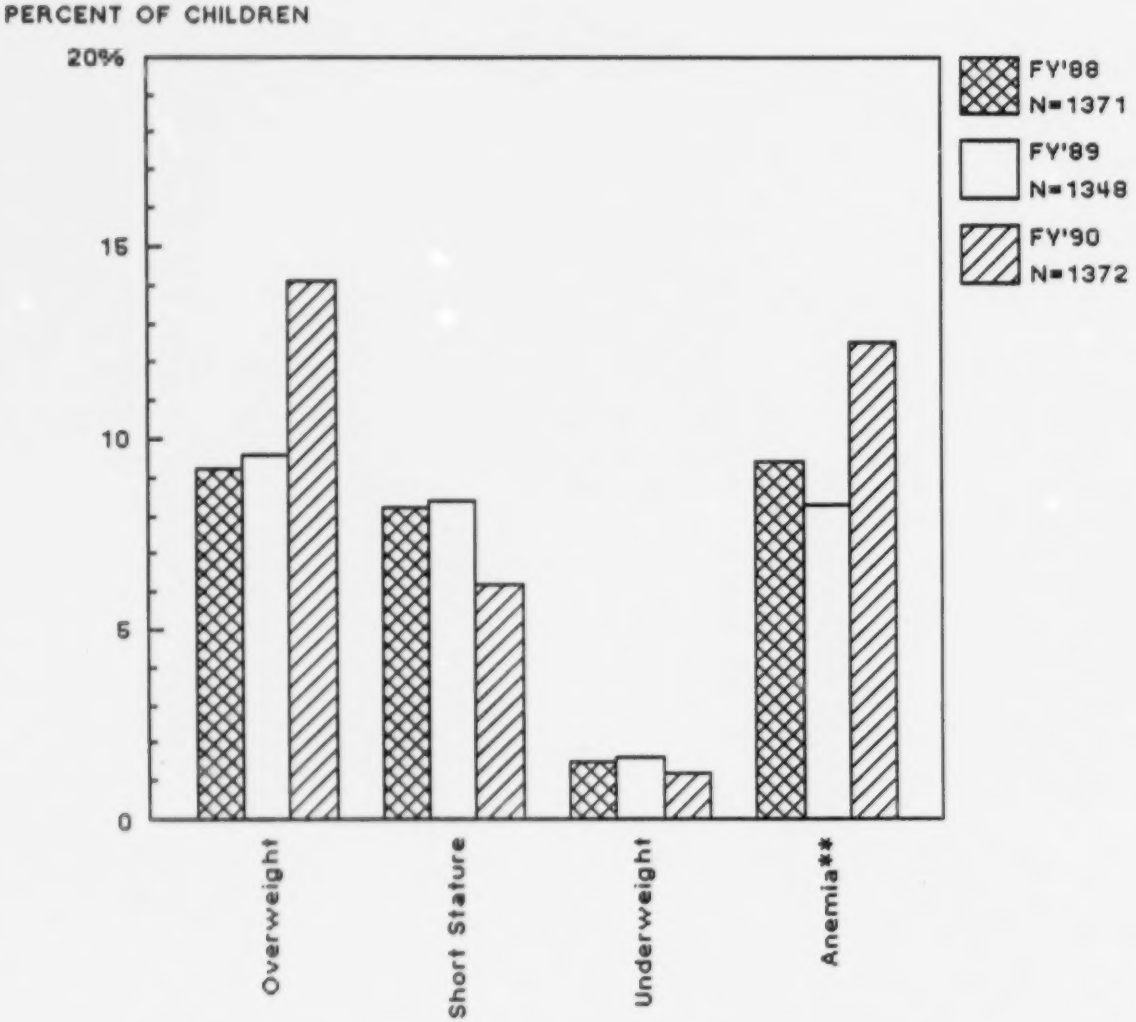


* EXPECTED PREVALENCE
N=3181
**N=2282

NUTRITION COUNTS, FY'90
SOURCE: MDPH, ON, OSE, 1990

FIGURE 2

COMPARISON OF FY'88, FY'89 AND FY'90 RESULTS
7 HEAD START SITES WITH CONTINUOUS PARTICIPATION



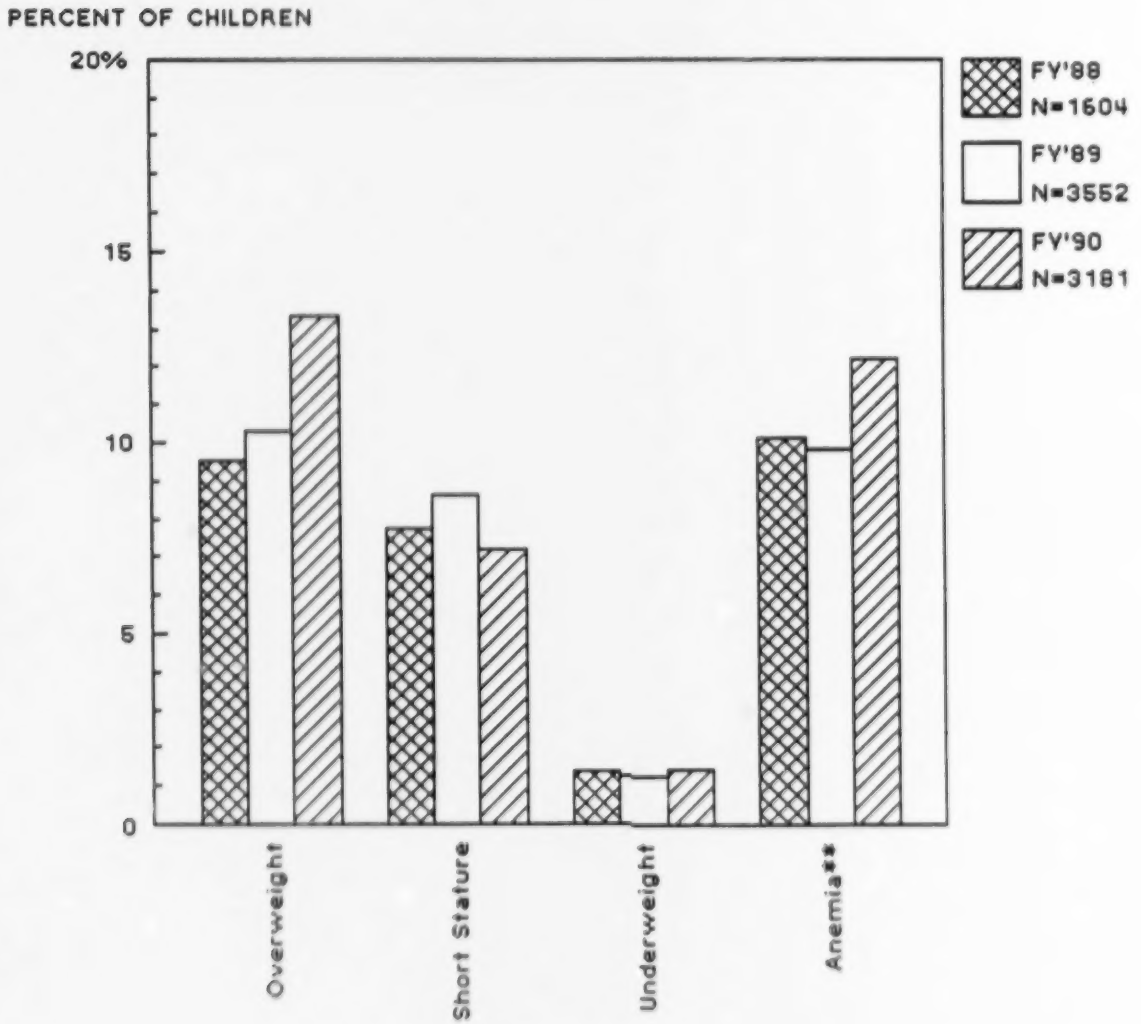
* Expected Prevalence

Source: MDPH, ON AND OSE, 1990
MASSACHUSETTS NUTRITION COUNTS

** FY'88 N=955
FY'89 N=935
FY'90 N=891

FIGURE 3

COMPARISON OF FY'88, FY'89 AND FY'90 RESULTS ALL PARTICIPATING HEAD START PROGRAMS



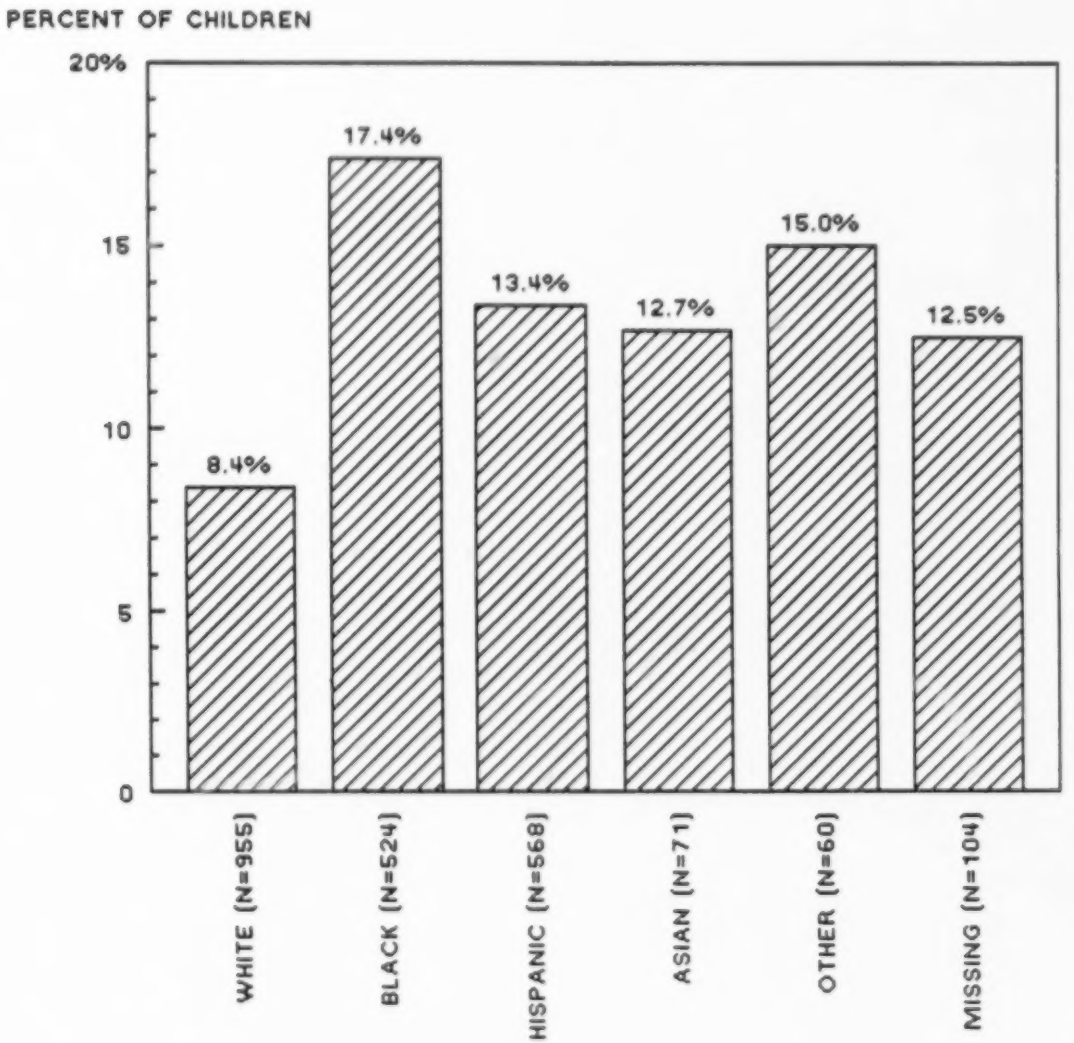
* Expected Prevalence

Source: MDPH, ON AND OSE, 1990

MASSACHUSETTS NUTRITION COUNTS

** FY'88 N=1165
FY'89 N=2359
FY'90 N=2282

FIGURE 4
PREVALENCE OF PROBABLE ANEMIA* BY RACE
HEAD START CHILDREN



N=2282

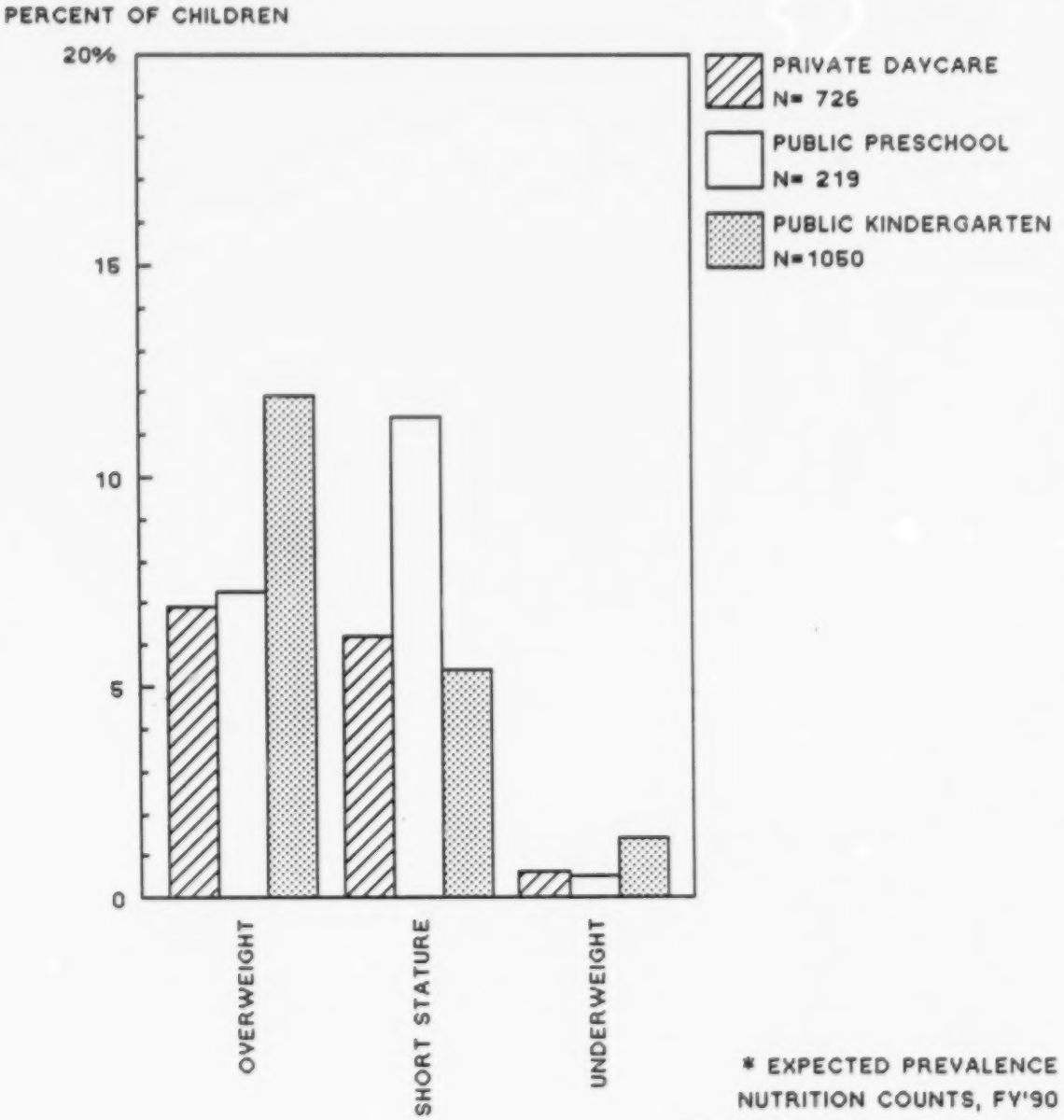
* ANEMIA BY EITHER HGB OR HCT VALUE

NUTRITION COUNTS, 1990

SOURCE: MDPH, ON, OSE, 1990

FIGURE 5

OVERWEIGHT, SHORT STATURE AND UNDERWEIGHT
PRIVATE DAYCARE, PUBLIC PRESCHOOL & KINDERGARTEN



* EXPECTED PREVALENCE

NUTRITION COUNTS, FY'90

SOURCE: MDPH, ON, OSE, 1990

SOURCE NOTES

1. 1983 Massachusetts Nutrition Survey. Division of Family Health Services, Massachusetts Department of Public Health. Boston: October, 1983.

2. Pediatric Pilot of the Massachusetts Nutrition Surveillance System: Analysis and Recommendations. Massachusetts Department of Public Health. Boston: October, 1986.

3. SAS Institute, Inc. SAS User's Guide: Basic's Version 5 Edition. Cary, NC: SAS Institute, 1985.

4. Goldsby JB. Pct119d anthropometry Fortran subroutines. Atlanta: Centers for Disease Control, Nutrition Division, Health Promotion and Education, 1972.

5. Sullivan KM, Foster DA. dEPID, V.2.1. Atlanta: Centers for Disease Control, 1987.

6. Peterson KE, Frank DA: Feeding and Growth of Premature and Small-for-Gestational-Age Infants. In Taeuch HW, Yogman MW (eds.): Follow-Up Management of the High-Risk Infant. Boston: Little, Brown and Company, 1987.

7. Rathbun JM, Peterson KE: Nutrition in Failure-to-Thrive. In: Grand RJ, Sutphen JL, Dietz WH (eds.): Pediatric Nutrition: Theory and Practice. Boston: Butterworths, 1987.

8. Winick M: Childhood Obesity: Special Reference Briefs. NAL SRB 88-05. Beltsville, Maryland: National Agricultural Library, USDA, 1988.

9. Clark M, Royal J, Seeler R. Interaction of iron-deficiency and lead and hematologic findings in children with severe lead poisoning. Pediatrics 1988; 81:247-254.

10. Oski FA, Honig AS. The effects of therapy on the developmental scores of iron-deficient infants. J Pediatrics 1978; 92:21-25.

11. Fitzhardinge PM, Steven EM. The small-for-date infant: I. Later growth patterns. Pediatrics 1972; 49:671-681.

12. Bech GJ, van de Berg BJ: The relationship of the rate of intrauterine growth of low birthweight infants to later growth. J Pediatrics 1975; 86:504-511.

13. Villar J, Belizian JM, Spaulding J et al.: Post-natal growth of intrauterine growth retarded infants. Early Human Dev 1982; 6:265-0271.

14. Gayle HD, Dibley MJ, Marks JS, Trowbridge FL: Malnutrition in the First Two Years of Life. Am J Dis Children 1987; 141:531-534.

Nutrition Counts

Pediatric Health and Nutrition Data Form

SITE ☐☐ TOWN ☐☐☐

1. CHILD IDENTIFICATION
   a. first 3 letters of last name 1a. ☐☐☐
   b. child code or record number b. ☐☐☐☐☐☐☐☐☐☐
2. CHILD'S HOME ZIP CODE 2. ☐☐☐☐☐
3. DATE OF BIRTH (MM/DD/YY) 3. ☐☐/☐☐/☐☐ IS BIRTH YEAR CORRECT?
4. SEX (M or F) 4. ☐
5. RACE 1. White 2. Black 3. Hispanic 4. Asian/Pacific Islander 5. ☐
   5. American Indian/Alaskan Native 6. Other (Specify) _____ 9. Unknown
6. ANCESTRY 1. Puerto Rican 2. Cambodian/Vietnamese/Laotian 6. ☐
   3. Cape Verdean 4. Other Portuguese 5. Haitian 6. Pakistani/Asian Indian
   7. European or African American 8. Other (Specify) _____ 9. Unknown

7. DATE OF HEIGHT/WEIGHT MEASUREMENT 7. ☐☐/☐☐/☐☐
8. HEIGHT (Note: 1/4"=2/8ths 1/2"=4/8ths 3/4"=6/8ths) 8. ☐☐ inches ☐ /8ths
9. WEIGHT (Note: 1/2lb=2/4ths) 9. ☐☐ lbs ☐ /4ths

10. DATE OF MOST RECENT HEMOGLOBIN OR HEMATOCRIT 10. ☐☐/☐☐/☐☐
11. HEMOGLOBIN (most recent) 11. ☐☐.☐ gms/100ml
    or
12. HEMATOCRIT (most recent) 12. ☐☐.☐ percent

13. DATE OF MOST RECENT FEP OR LEAD TEST 13. ☐☐/☐☐/☐☐
14. FEP (EP) Please make sure FEP and 14. ☐☐☐ ug/dl
    or LEAD values have not been
15. LEAD (Pb) switched 15. ☐☐☐ ug/dl

16. BIRTHWEIGHT 16. ☐☐☐☐ grams OR ☐☐ lbs ☐☐ oz
17. BLOOD PRESSURE (systolic/diastolic) 17. ☐☐☐/☐☐☐

18. PROGRAM PARTICIPATION AND INSURANCE (check one box for each item)

		Yes	No	Don't Know	DPH Use Only
a. WIC	a.	☐	☐	☐	a. ☐
b. Food Stamps	b.	☐	☐	☐	b. ☐
c. AFDC	c.	☐	☐	☐	c. ☐
d. CommonHealth	d.	☐	☐	☐	d. ☐
e. Medicaid	e.	☐	☐	☐	e. ☐
f. Blue Cross/Blue Shield	f.	☐	☐	☐	f. ☐
g. HMO	g.	☐	☐	☐	g. ☐
h. Other Health Insurance	h.	☐	☐	☐	h. ☐